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Elderly people's adaptability to complete denture therapy: usability of a geriatric behaviour-rating scale as a predictor

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ABSTRACT

Accurately predicting prognosis of complete denture therapy requires a reasonable estimation of the ability of a patient to adapt. The aim of the current study was to test the usability of a geriatric behaviour-rating scale (BOP) as a predictor of elderly people's ability to adapt after complete denture therapy. Ninety-five complete denture-wearing residents of four nursing homes for somatically handicapped patients were randomly divided into two groups, 48 test subjects for whom replacement dentures were prepared and 47 test subjects whose current dentures were improved on. The results of these treatments were evaluated by comparing the scores on the so-called 'scale of appreciation' (complaints of and (dis)satisfaction with complete dentures) prior to and at 2 and 6 months post-treatment. Univariate correlations were computed between the scores on the 'scale of appreciation' or the differences in scores at the three evaluation-moments and the foremost BOP-subscale (BOP1, infirmity) and some factors that were considered to be of influence on the process of adaptation. The BOP1 was the only factor showing a significant correlation with the 'scale of appreciation' at 2 months post-treatment; this suggests that little infirmity was connected with a low value of complaints of and dissatisfaction with complete dentures or a positive alteration of this value. It is concluded that the BOP1 can be a useful predictor of complete denture therapy in this group of elderly people. A relationship between elderly people's adaptability to complete denture therapy and the BOP or any other geriatric behaviour-rating scale could be possible.

KEY WORDS: Prosthetic dentistry, Complete dentures, Geriatric dentistry, Adaptability

J. Dent. 1995; **23**: 151-155 (Received 5 June 1992; reviewed 31 January 1994; accepted 31 May 1994)

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INTRODUCTION

Oral health problems of elderly people should not be reviewed and treated as isolated problems. Thorough assessment, diagnosis and prognosis are the keystones for clinical decision making. In this process of clinical treatment planning prognosis is considered to be the most problematical¹.

Accurately predicting prognosis of complete denture therapy requires a reasoned estimation of a patient's adaptability. Adaptability to new or changed situations tends to decrease with age; this is caused by the physiological process of ageing, in particular that of the neuromuscular system². Logically, physiological ageing and consequently adaptability to change are influenced

by pathological conditions. It has been demonstrated that younger people have less problems with denture adaptation than elderly people³⁻⁴.

In nursing homes geriatric behaviour-rating scales are used in order to categorize elderly patients. The most commonly used scale in The Netherlands is the 'Beoordelingsschaal voor Oudere Patiënten' (BOP).

THE BOP; A GERIATRIC BEHAVIOUR-RATING SCALE

The BOP is a behaviour-rating scale for elderly people. It is a revision and a Dutch adaptation of the internationally accepted Stockton Geriatric Rating Scale⁵. Research in

the USA has shown that this scale and its modifications constitute valid measuring instruments⁶⁻¹³. The BOP assists nursing staff to structure and report their observations of elderly people. It rates 35 aspects of everyday behaviour in a three-item scale. The interrater reliability and internal consistency have been assessed extensively and are considered to be scientifically acceptable¹⁴. Completion of the BOP requires very little interpretation; almost all of the questions can be answered on the basis of a simple observation of the patient's behaviour over a 2 week period. Each item indicates the extent to which a patient's behaviour is disturbed via a score of 0 (no problem), 1 (mild problem) or 2 (severe problem). The answers are demonstrated by descriptions of the behaviour, e.g.:

The patient walks:

- independently0
- with help (walking aid)1
- only with nurses' assistance2

Hidden structures in the BOP-list have been identified by means of factor analysis. On the one hand some aspects of behaviour or symptoms have been found to correlate to one another, yet on the other hand such aspects were shown to operate more or less independently from other groups of aspects. Such a group of questions, which together can give some information about one aspect of the patient's behaviour, is called a subscale of the BOP. There are six subscales: infirmity, aggressiveness, physical invalidity, depressive behaviour, psychic invalidity and inactivity.

The first and foremost subscale (BOP1) consists of 23 items and gives information about infirmity and its score indicates the extent to which a patient is dependent on other people. This subscale covers a wide range of behavioural disturbances, such as disorientation, disturbed communication, inactivity, incontinence, stereotype behaviour, restlessness and disorders in the normal daily routine such as washing, getting dressed, eating, etc.

AIM OF THE STUDY

The aim of the current study was to test the usability of a geriatric behaviour-rating scale (BOP) as a predictor of elderly people's adaptability to complete denture therapy.

MATERIALS AND METHODS

Test subjects

Ninety-five complete denture wearing residents of four nursing homes for somatically handicapped patients in the surroundings of Leiden, The Netherlands, were the test subjects. The ages of the test subjects varied from 65 to 99 years with a mean age of 81 years. The test subjects were 32 men (34%) and 63 women (66%) who were in need of complete denture therapy, as determined in a denture screening test.

Clinical trial

In this clinical trial a patient's adaptability to complete denture therapy was defined as *the patient's ability to 'embody' replacement or improved dentures, coping with all reasonable technical and aesthetic requirements, in such a manner in the total system of mental and physical functioning that the dentures give no rise to persistent complaints or dissatisfaction*.

The 95 test subjects were randomly divided into two groups, 48 test subjects for whom replacement dentures were prepared (Group REPL) and 47 test subjects whose current dentures were improved on (Group IMPR). Preparation of replacement dentures and improvement of current dentures (relining or rebasing and/or occlusal adjustment) were performed by three experienced dentists using standardized methods. All treatments were completed within a 3 month period.

Each test subject's BOP score was determined before treatment. In addition factors such as age, gender, education, degree of maxillary and mandibular alveolar bone resorption, duration of edentulousness in maxilla and mandible, age of current maxillary and mandibular dentures and the number of maxillary and mandibular dentures which has been worn, were assessed. Such factors have been demonstrated to influence the process of adaptation to replacement or improved current dentures. Furthermore, the patients' complaints of and (dis)satisfaction with their complete dentures were registered. The BOP scores were determined by the ward-heads in the nursing homes after a 2 week period of patient observation. The degree of alveolar bone resorption was assessed by three experienced dentists according to the method of Kalk and de Baat¹⁵. A questionnaire was developed in order to assess the remaining adaptation-influencing factors (part I of the questionnaire) and to register the patients' complaints of and (dis)satisfaction with their complete dentures (part II of the questionnaire). The questionnaire was based on questionnaires of previous comparable studies¹⁶⁻¹⁹. Three preinstructed dental students filled in the questionnaires while interviewing the test subjects. Two and 6 months post-treatment the test subjects were re-interviewed; on these occasions only part II of the questionnaire (complaints of and (dis)satisfaction with complete dentures) was filled in.

The BOP-scores were also determined again at 2 months post-treatment and for every test subject this score was compared with the score prior to treatment, resulting in only small differences. If a large difference in score had resulted there could have been a change in the possible predictive value of the BOP. Exclusion of test subjects from the clinical trial should have been considered for this reason.

During the clinical trial a strong reduction in numbers of test subjects occurred, from 95 at the start of the clinical trial to 39 at 6 months post-treatment (59%). This reduction is listed in Table I: 27 test subjects died, 11 refused treatment, 11 were dismissed from the nursing home and seven were too unhealthy.

Table I. Review of the reduction in numbers of test subjects during the clinical trial

Stage of clinical trial	Groups (no.)		Total (no.)	Reduction (no.)
	REPL	IMPR		
Start	48	47	95	
Treatments finished (3 months)	24	33	57	38
Post-treatment (2 months)	21	27	48	9
Post-treatment (6 months)	17	22	39	9
Total				56

REPL, replacement dentures; IMPR, improvement current dentures.

Table II. Comparison of the scores on the 'scale of appreciation' for the two groups prior to and at 2 and 6 months post-treatment

Group	M	Prior to			2 months post				6 months post			
		s.d.	s.e.m.	n	M	s.d.	s.e.m.	n	M	s.d.	s.e.m.	n
REPL	-0.13	0.75	0.16	21	-0.28	0.81	0.18	21	-0.09	0.72	0.17	17
IMPR	-0.12	0.70	0.13	27	-0.10	0.65	0.12	27	-0.10	0.66	0.14	22
Total				48				48				39

REPL, replacement dentures; IMPR, improvement current dentures; M, mean score; s.d. standard deviation; s.e.m., standard error of the mean; n, number of test subjects.

Statistical methods

Statistical analysis of the answers to part II of the questionnaire (complaints of and (dis)satisfaction with complete dentures) revealed seven groups of questions. The intercorrelations between these seven groups were very high and they were standardized into the so-called 'scale of appreciation', being the mean of the seven Z-scores, finally ranging from -1.1 to 1.9. The reliability of this scale was very high, prior to and at 2 and 6 months post-treatment (Cronbach's alpha was respectively 0.88, 0.86 and 0.91).

Univariate correlations between the scores on the 'scale of appreciation' or the differences in scores at the three evaluation-moments, and the foremost BOP subscale (BOP1) and the factors that were considered to be of influence on the process of adaptation (part I of the questionnaire), were computed using the Statistical Package for the Social Sciences (SPSS) computer software²⁰. It had not been possible to assess all adaptation-influencing factors for all test subjects, resulting in smaller groups for this analysis (at 2 months post-treatment, 44; at 6 months post-treatment, 35). Some factors (duration of edentulousness, age of current dentures, number of dentures which had been worn) showed such a very high correlation with respect to maxilla and mandible (Pearson's correlation coefficient:

0.91-0.99) that it was decided to include in the analysis only these factors with respect to the maxilla.

RESULTS

Table II lists comparisons of the scores on the 'scale of appreciation' of the two groups (REPL and IMPR) before and at 2 and 6 months post-treatment. The first comparison was carried out for those test subjects who participated in the clinical trial until 2 months post-treatment and the scores of this group were compared with the scores of the 39 remaining test subjects (i.e. 6 months post-treatment). The small differences were not significant (paired *t*-test). It can be concluded that on average the treatments in both groups of test subjects did not change their complaints of and (dis)satisfaction with complete dentures.

Results of computing the univariate correlations between the scores on the 'scale of appreciation' or the differences in scores at the three evaluation-moments and the various factors (the BOP1 and the adaptation-influencing factors) are listed in Table III. The BOP1 was the only factor showing a significant correlation with the 'scale of appreciation' at 2 months post-treatment; this suggests that a low value of the BOP1 score (little infirmity) was connected with a low value of complaints of and dissatisfaction with complete dentures or a positive

Table III. Results of computing the univariate correlations between the scores on the 'scale of appreciation' or the differences in scores at the three evaluation-moments and the various factors (the BOP1 and the adaptation-influencing factors) before and at 2 ($n = 44$) and 6 ($n = 35$) months post-treatment

Various factors	Prior to	'Scale of appreciation'			
		2 months post	2 months post/ prior to	6 months post	6 months post/ prior to
BOP1	0.17	0.49**	0.37*	0.26	0.02
Age	-0.25	-0.04	0.25	-0.08	0.15
Gender	0.11	-0.04	-0.07	0.01	-0.19
Education	-0.22	-0.33	-0.13	-0.26	-0.07
Degree of max. resorption	-0.05	-0.20	-0.18	0.01	0.19
Degree of mand. resorption	0.14	-0.01	-0.17	-0.01	-0.07
Duration of max. edentulousness	0.00	0.16	0.18	0.12	0.32
Age current max. denture	-0.26	-0.17	0.10	-0.40	-0.06
Number max. dentures worn	0.14	0.10	-0.05	0.29	0.30

*Significant ($r > 0.30$); **highly significant ($r > 0.38$).

alteration of this value. Thus, the BOP1 can be a useful predictor of complete denture therapy in this group of elderly people.

DISCUSSION

It could be stated that it would have been better to determine the BOP score for every test subject again at 6 months post-treatment to check for possible large differences from BOP1 scores. Since the changes at 2 months post-treatment were very small, not resulting in exclusion of test subjects, and since determining BOP scores is time consuming for the ward-heads of the nursing homes it was decided that this option need not be adopted.

The reduction in numbers of test subjects ($56 = 59\%$) during the clinical trial was very disappointing and uncontrollable. In the first 3 months 20% of all test subjects died. Almost 20% of the total population of nursing home residents for somatically handicapped patients in The Netherlands died during the whole year 1987²¹, making the death rate for test subjects in this clinical trial quadruple that which could be reasonably expected. This reduction in numbers of test subjects is by no way related to any dental parameter and therefore it was not necessary to take this aspect into consideration in the statistical analysis.

The only statistically significant factor in computing the univariate correlations between the scores on the 'scale of appreciation' or the differences in scores at the three evaluation-moments and the various factors (the BOP1 and the adaptation-influencing factors) was shown to be the BOP1. Thus, it could be concluded that the BOP1 may be useful as a predictor of complete denture therapy in this specific group of patients and a relationship

between elderly people's adaptability to complete denture therapy and the BOP may be possible. Further research is necessary to corroborate these preliminary findings. Also research with other geriatric behaviour-rating scales, especially those adapted from the Stockton Geriatric Rating Scale, can be recommended.

Acknowledgements

The authors are most grateful to Professor J. F. McCord, Dental School of the University of Manchester, for his constructive criticism and valuable linguistic assistance during the preparation of the manuscript.

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